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Questions and Answers: Critical Issues in Aviation and Aerospace Education

CONFERENCE -- QUESTIONS AND ANSWERS

CRITICAL ISSUES IN AVIATION AND AEROSPACE EDUCATION

The question and answer period following the presentations was moderated and panelled as follows:

Moderator:

Mr. Frank Mitchell

Panel:

Dr. Floyd H. Price
Mr. Raymond J. Johnson
Ms. Jo Ann Eisenzimer
Dr. Thomas J. Connolly
Dr. Henry R. (Hank) Lehrer

Frank: A question for Dr. Price. What is the best way to obtain curriculum materials?

Floyd: There's numerous lists from various organizations, state departments, various publications have lists, NASA has a list, FAA has a long, long list of available materials. Many of these things are simply available by--I guess being a good teacher--beg, borrow, and steal all the things you can find. I suppose the first two lists I would recommend to you are FAA's list and NASA's list; then you can go from there. Various state departments have lists, organizations have lists, in the material that's available over in the display booths, the exhibitor's booths, you can find lists of things there. Ask, beg, from all of your friends, workshop directors. Just look around.

Frank: A related question to Dr. Price's comment. There was a question about how do you get Beech and Cessna materials for the class room?

Floyd: Just come by our booth. We've got a lot of the materials that's available to you, and you can pick up many of them there, along with other manufacturers and organizations.

Frank: A question to Tom (Connolly) or Hank (Lehrer). Given the facts of rapidly increasing enrollments, do you see a forthcoming shortage of aviation faculty in higher education ?

Tom: Yeah. Let me comment just quick, and then Hank can amplify if he wants. And I might follow-up on what Floyd said also. We have FAA education resource centers around the country that are good places to tap into for material. If any of you are not familiar with those already, you can get a listing of the approved resource centers. We have one in Embry-Riddle, and the UAA has one at Auburn now. They are just chock full of resource materials for sample curriculums and materials that you can use for all levels. (pause) Just about forgot what the question was. (chuckles)

Frank: Concerning a shortage of aviation faculty. (laughter)

Tom: Remember--I was talking about judgment, not memory! (more laughter) Yes, in answer to your question, there's a chronic shortage, and it appears to be getting worse at all levels of the aviation industry: pilots, mechanics, and, yes, teachers at all levels. The level I'm familiar with is the college level. I've been involved in recruiting and hiring, and I can tell you, as our programs grow and develop, we experience increased encouragement from our accrediting agencies on academic qualifications, along with technical skills and technical experience. It is very difficult to find qualified personnel out there to fill out the ranks at the faculty level. Hank, you want to expand that?

Hank: One thing that was always amusing to me when I would apply for a job, the job description would say "a bachelor's or master's in an aviation-related field." Well, I hated to tell them that when I got my bachelor's and master's there were no degrees in those areas. So, things have changed although the cast of players is still the same: we have students and faculty members. But we have much more emphasis on quality as far as--well, the three-legged stool that I was always aware of when I was going for tenure was service, teaching, and scholarly productivity. The expectations for

a faculty member are becoming much, much more difficult. In our department at Embry-Riddle we're wrestling with the problem of what is a terminal degree? Is it a Doctorate, is it a Master's, is it a Bachelor's? Just being able to point the airplane in the right direction is not enough anymore. We're training students, at least at the university level, to fly equipment they wouldn't even let us touch four or five years ago. So, we have to--you've got to be very, very, very skilled. You have to be a writer. You have to be innovative. I think there's people out there--I don't see a shortage of quality. I think the idea would be--people who decide college teaching is going to be what they're after have to realize it's hardball.

Tom: Let me just expand one bit there, too. If any of you are interested in that area, in the back of the University Aviation Newsletter--if you're not familiar with it, you might stop by the booth out there--the UAA booth in the exhibit hall. In the back of our regular newsletter, as a regular feature of that newsletter, are examples of job openings that are available at the university level. I've watched that list grow from nothing to a couple of pages now. The demand is there.

Frank: Thank you. A question for you, Ray Johnson. Has a rationale with advantages for infusing aerospace education into the curriculum been developed or adopted by national and local aerospace education organizations?

Ray: I think there has probably been many rationales developed. One of the problems I see is fragmentation. And you can go into many, many states that have state committees, state councils, that have developed these rationales, and although they follow a general pattern, I would say none of them is THE rationale. OK?

Frank: On another question in this area, Jo Ann, let me ask you. Why hasn't aviation/aerospace education been brought into schools through incorporation into various textbooks?

Jo Ann: I think the basic reason, from the research we have done, is that major textbook companies have steered away from this because of school curriculum guidelines developed at the state and local levels. There was not a need for it there. I think they thought -- something that's already been done and working well is what the teacher needs and wants. You know how THAT goes. So, there's never been any push, even though the research has been developing and progressing. The research has not basically said it's an absolute need. I don't think the need came to light until the last four to five years, and I think that's probably the biggest thing that Project Synthesis and Project Twenty Sixty-One did for us.

Frank: I see. Thank you. There are two general topic questions that Russ and I could answer specifically from our relationships with Beech and Cessna, but I'd like to have someone on the panel comment. Is the aerospace industry actively involved in reducing class sizes, and funneling funds to schools to help with the ever-increasing cost of education? Another question related to that one--Are there currently plans by different aerospace industries to adopt schools where jobs will be waiting for top graduates? Would any of you care to comment on those questions? Tom, how about you? You're smiling.

Tom: That's a tough one. There's obviously a lot of interest and a great deal of support, even financial support, from the Federal government in terms of the airway science program. It's been a struggling program, but the grants were implemented at the university level four or five years ago, and have continued through last year. I believe the FAA is asking for $10 million dollars next year.

They're also talking, by the way, about expanding the airway science program. There's all kinds of ideas out there about how we might use that money to assist students. Most of the grants up to this point have been facilities and equipment money. Now we're talking about how that money might be better directed

toward individuals in terms of student loans, student aid, and student assistance with the very high cost of this training. We have received a great deal of support from the industry in terms of moral encouragement. In our particular position at Embry-Riddle, I see co-op programs set up with United Airlines. UA is assisting students to receive the training that heretofore wasn't available. We have scholarship programs. Simu-Flight, for example, takes two of our junior level students for a Citation-type rating. It's an $8,000 value scholarship, and they do this twice yearly. We have support from people like Rudy Frascas, Russ Watson over at Cessna, I hesitate to start identifying individuals for fear I'll miss someone. But, yes, there is interest and support from the industry, and I see that growing.

Frank: OK. Thank you, Tom. Let me ask a question of Ray, here. How do we elicit the public understanding of aviation/space education's ability to address general educational needs?

Ray: I think it has to start with those that have national channels of communication. That's a broad general statement, but basically, we have spent a great deal of time over the many years since World War II talking to each other. I think we have to reach out. If you'll look at who is saying aerospace education is good, or aviation education or space education is good, it's largely those that are involved. So, as a result, we really become a lobby organization along with 200 other industries who also feel that their specialized eduction is good. I think we have to get together with those who have channels of communication in the national education organizations. For instance, if we want to influence the state superintendents of public instruction, we should get together with their association, the National Association of State Education Officials, and have something through their channels of communication.

Frank: Ray, thank you. Dr. Price, aerospace education workshops seem designed for teachers in service. How can aviation education be

taught to undergraduate education students so that they can use it before the beginning of their teaching careers?

Floyd: This is pretty difficult. For our undergraduate teacher education program, and I'm sure we're typical of most teacher-training institutions, the requirements are so tight. I have looked and talked for 20 years about ways of including some aviation/ aerospace education into our undergraduate teacher education program before these people graduate and go out as teachers. You can imagine about how far I get. Every person on the campus is saying the teacher needs this--they need that--and it's almost an impossible task. That's a cop-out, I'm sure, but that's sort of where we are. It's a problem. I don't have an answer for you. I wish I did. I guess we do the next best--if we can't get to the teacher before they graduate, then this is one thing we try to do in "In Service."

Frank: OK, thank you. Yes? (Question is inaudible.)

Floyd: We do some awareness things and periodically I leave my materials scattered around even though we only do the workshops in the summertime. In the winter there's lots of material floating from class to class--students come in who are doing reports--students come in who are teaching and need projects. But, like a part of a course that all pre-elementary education teachers would get, I don't have much success, I'm sorry to admit.

Hank: I'll make this real quick. I come from Embry-Riddle. We don't have an eduction program at ERAU, but we're very interested in the use of aviation/aerospace to enhance the teaching of any discipline in the secondary or elementary school. We've been working closely with teachers in the Volusia County area, and this year we've been funded by the State of Florida to work with Stetson University, Bethune Cookman College, and the University of Central Florida. In their areas that have teacher education programs, we will start offering a methods workshop. It's a very

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innovative approach and, I think, a very giant step in the right direction.

Frank: The question is: Do we have a teacher training opportunity for professors already at the college level to enable them to teach aerospace education? Dr. Price, would you like to comment on that?

Floyd: There are a few opportunities like this provided. Each January there's a workshop at the Airforce Academy. Estes Industry provides some workshops for workshop directors. It's basically for those people already involved in aerospace education workshops. For the person who's teaching science methods for elementary teachers, there isn't anything planned. Of course, it doesn't have to be science, language arts, or social studies methods. Unfortunately, I'm afraid those people at our institution wouldn't attend if we had one. I hate to admit it, but that's the truth.

Frank: Because of our commitment to you on time, and we are running a couple of minutes over, I'm going to just go through three more questions here. Tom Connolly, for you. At what age have you found judgment technability exists, and is learning an issue here? Readiness learning.

Tom: Reading learning IS an issue. I've had the good fortune to have experience teaching at the junior high and high school level before going to the college level. So, I'm somewhat familiar with the needs at that point. I guess maybe what I should have done when I made my talk was define judgment to start off with.
We define judgment generally as the identification of choices, first of all, or alternative choices, specify an outcome for each of those choices, and then select one or more of those avenues. And that can range on a spectrum all the way from very simple judgments on one end, usually referred to PJ's (performance judgments), to cognitive judgments, or very complex judgments, on the other end. As you move along the spectrum, we vary the difficulty or

complexity of the judgment process simply by introducing two things: 1) the number of choices available, and 2) the uncertainty of the outcome. The more choices, obviously, the more difficult the process becomes--AND the more uncertain the consequences of each choice, the more difficult the process becomes. So, the answer is "yes," readiness is obviously always a problem. But, we're simply talking about a continuous early introduction into the process of making the decisions and judgments. That means that, at whatever level we decide we want to introduce it, we obviously have to tailor-make it to a level where the students are able to specify the choices that you want available for the problem they're dealing with, and the possible outcome. Then, as they move along the spectrum into the higher levels, secondary and college levels, we can talk about introducing elements of stress and time into the formula, also.

Frank: Thank you. Dr. Lehrer, let me ask you a combined couple of questions here. How will joint work on a paper affect authorship as far as copyright aspects on what you were talking about, and do you feel there are sufficient publishing outlets for aviation education today, and could you give an example or two?

Hank: One of the problems--I think I can take these in reverse order--one of the reasons the *Journal* is going to happen, and is happening, is because there are not sufficient outlets, particularly for college faculty members who, as I say, are looking for promotion, tenure, and merit. This is one of the things--there just are not enough places. I've had a number of people, and myself included, who have had the rejection letter which says, "A well written piece, but our audience is not interested in that." So, that's the important thing. Now, as far as joint authorship and copyright: normally, the first author is the primary author. As far as someone claiming authorship as the primary author, that's up to you to work it out if you're joint authoring with someone. As far as copyright is

concerned, everything for the *Journal* is copyrighted by ERAU, currently. OK?

(There is an inaudible question from the floor.)

Hank: Well, it counts a lot more than if you had never done it at all. So that's probably the better answer, I think. And I think it's up to you, if you're interested in this partnership idea, to really realize what kind of a relationship you establish with someone. You decide who's going to be the first author. I've been the principal investigator on a number of grants. That doesn't necessarily mean I work the most. So, it just depends on whatever you decide to do. You'd work that out if you were interested in doing that.

Frank: One more question. I have so many more questions I'm sure we could go on for another forty-five minutes here, Russ, but I think we'd better, in the interest of time, shut this down from that standpoint. We will turn the questions over to the panel for their review as far as future interest is concerned. Before I ask the last question, I want to indicate to you--you do critique forms that have been passed out by the congress. We appreciate your comments on those.

The last question to Jo Ann. Geography has been identified as a weak link in American education. Aviation/aerospace is intimately linked to geography. Why not work to combine those two? And, secondly, would you care to comment on minority students in disadvantaged areas as far as having an aerospace role in their lives?

Jo Ann: I'll try. Aerospace education in relationship to geography, I think, is a natural. It's already there. The geography point is your exact lead-in to social studies. When we talk about social studies, we talk about history and geography. It's an absolute in-road because it's always there. So, when you talk about geography . . . you can't go anywhere without figuring out where you're going. Obviously, space. Obviously, you'll fly. What kid doesn't

like to fly? So, you've got motivation, you've got creativity. Design a way, other than going by airplane, that keeps you off the ground to get there!

Teachers are innovative or they probably wouldn't be teachers. But let me tell you, children are far more creative and innovative than you ever thought of being because you haven't been there for a long time. So, get that child to figure out how to get there. He'll work geography into every movement he takes: from the room to the lunchroom; from the room to the bathroom; from the room down the hall. The geography of the building has a lot to do with what he's doing. He may fly there, in his own way. So, I think the geography aspect of it works in absolutely perfectly.

As for a minority, I guess I probably work with minorities. I work with a group in my school of landless Indians. The sector of that part of education, I find, is they have a more limited, less opportune background to work with the aviation industry. One of the biggest things I've found, and probably one of the biggest rewards in my teaching career, was that I know I gave, or allowed the opportunity to happen, for a child to take an airplane ride. That will possibly be his only airplane ride in his life. They have just as much creativity, just as much intelligence, just as much of everything, if given the correct opportunity. All you have to do is feed them a little line. Put that carrot out there for them to go on and they they'll take it. When we talk about minorities and the opportunities they do not have, a lot of times, I think, it my be because some teacher didn't offer that opportunity to them. So, as far as eduction goes, I think we have a lot to offer in that area.

Frank: Thank you very much.

BIOGRAPHIES OF THE PANEL

Frank G. Mitchell directed the development of the aviation industry's first comprehensive aviation education program, ranging from elementary grades through college, while at Cessna aircraft (1964-1984). He later developed and managed their domestic and international franchised flight training programs. At Beech Aircraft Corporation since 1984, he directs the Beech aviation education programs and works with all major aviation organizations in promoting and supporting general aviation. He is a member of the Kansas Commission on Aerospace Education and currently serves as chairman of the General Aviation Manufacturers Association Education Committee.

Floyd H. Price is currently Professor and Chair of the Department of Curriculum, Instruction, and Policy Studies with Kansas State University. Professor Price majored in Educational Administration and Curriculum when he earned his Ed.D. at the University of Oklahoma. In the field of aviation education, in addition to having numerous research papers and a teacher's packet published, Dr. Price has served on several State Department of Transportation committees. He has received several awards including the Frank C. Brewer Award in Recognition of Aerospace Education Activities.

Raymond J. Johnson is head of the Chicago office of the Illinois Department Of Transportation, Division of Aeronautics. He has an extensive background in both aeronautics and aviation education. He has had a leadership role in several organizations and is currently serving as senior vice president of the National Aeronautic Association, and is a United States delegate to the Federation Aeronautique Internationale (FAI). He is a past president of the Balloon Federation of America, and chairman of the Illinois Aviation Forum. A graduate of the University of Minnesota, he holds a Masters degree in Education from the National College of Education. Mr. Johnson is the recipient of many honors including induction into the Crown Circle of the National Congress on Aerospace Education and the FAI Paul Tissandier Diploma. He has also been inducted into the Illinois Aviation Hall of Fame.

Jo Ann Eisenzimer hold a Masters in Science degree in Elementary Education. Presently she is Deputy Chief of Staff--Aerospace Education, Rocky

Mountain Region, Civil Air Patrol. Among her directorships are Aerospace Education (CAP), Aerospace Workshop for Teachers (Eastern Montana College), and Aerospace Workshop (Montana Aeronautics Division). Ms. Eisenzimer has been involved in numerous aerospace education research projects. Active in professional and civic organizations, among many awards Ms. Eisenzimer has earned are the Montana Outstanding Teacher (1988) and the AFA Christa McAuliffe Award (1987).

Thomas J. Connolly, Professor of Aeronautical Science at Embry-Riddle Aeronautical University, Daytona Beach, earned his Ed.D. degree at Nova University. In 1989 he was national winner of the FAA's Administrator's Championship Award for Excellence in Aviation Education at the graduate level. For the past ten years, Dr. Connolly has been working with colleagues on problems related to pilot judgment. His work has been funded by grants from the FAA and U.S. Air Force Office of Scientific Research, and by fellowships from Universal Energy Systems and the American Institute of Aeronautics and Astronautics. He has written a number of technical reports for the U.S. Air Force, and has had papers published in the Proceedings of the Symposium on Aviation Psychology at Ohio State University and in the Aerospace Medical Association's journal, *Aviation, Space, and Environmental Medicine*.

Henry R. (Hank) Lehrer, Founder and Editor of *The Journal of Aviation /Aerospace Education and Research*, is Associate Professor of Aeronautical Science at Embry-Riddle Aeronautical University where he teaches graduate and undergraduate courses. Dr. Lehrer received his Ph.D. in Higher Education Administration at Bowling Green State University in 1985. In 1980, he was appointed Assistant Professor of Technology at Bowling Green and, in addition, from 1983 to 1987 he was a Designated Written Test Examiner for the FAA. Published in several journals, he has authored manuals and made numerous national presentations of aviation related articles. He has served as invited reviewer for many aviation textbooks, and has made a number of invited presentations. He is an experienced and successful researcher and grant applicant.